# SPOROTRICHOSIS IN THE UNITED STATES.*

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Ten years ago we were of the opinion that infection of the human subject with the sporothrix fungus was so rare as to be a pathological curiosity. At that time only three cases had been mentioned in the literature of America and no cases had been recognized in any other country. During the last six years, however, more than 50 cases have been reported from France, one or two cases have been observed in Germany, and 44 additional cases have been reported from different parts of the United States. In addition to these, I have been able to collect 10 new cases from the United States which have not yet been reported (some of these will be reported by those in whose practice they occurred), making a total of 57 cases thus far observed in the United States.

My attention was called to the existence of this disease in North Dakota by the report of a case from Braddock, N.D., by Hyde and Davis[1] about two years ago. The description of this case recalled to my mind a conversation with Dr. E. P. Quain of Bismarck, who had been treating similar cases and had reported six of these as cases of "Tubercular Ulcers and Tubercular Lymphangitis of the Upper Extremity." Dr. Quain was not satisfied with that diagnosis and we have shown since that it was incorrect, and that these were, in fact, cases of sporotrichosis.[2] During the last two years, I have been engaged in making a careful study of the prevalence of this disease in North Dakota and have been able to collect 22 authentic cases, six of which were diagnosed culturally.

While getting together the histories of the cases in North Dakota, I was impressed by the fact that all the cases that have been observed were found in a definitely limited strip of territory along the Missouri River. This fact led me to make a careful study

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[1] American Dermatological Association, Washington, May, 1910.

[2] Ruediger and Miller, *Northwestern Lancet*, 1911, 31, p. 507.

of the geographical distribution of all the cases reported from the United States and I found that approximately five-sixths of the observed cases are from the Missouri Valley. This fact will be seen at a glance by referring to the accompanying map where the location of each case is indicated by a dot.

Only 24 of the 57 cases I have collected from the United States were confirmed by a cultural or microscopic diagnosis. It is possible that some errors in diagnosis have crept in, although the histories and descriptions do not indicate that this is the case. In view of this fact, however, the following very brief abstracts of all the case histories may serve a useful purpose in this connection. They are grouped according to the states in which they occurred.

MISSOURI.

*Case 1.*—The first case of sporotrichosis that has been recognized is that of Schenck.[1] The patient, male, aged 36, was working in an iron foundry in St. Louis at the time infection occurred. The infection started from a scratch on the finger, made by an old nail. Three weeks after the injury was received, an ulcer appeared higher up on the finger and in seven weeks seven similar abscesses formed in the lymph channels on the radial side of the arm. Cultural diagnosis was made.

*Case 2.*[2]—The patient, a farmer's daughter, aged 18, was a resident of Independence, Mo. Infection started from a slight wound on the back of the right hand. Several weeks later two small subcutaneous abscesses developed, one on the wrist and one higher up on the forearm. Cultural diagnosis was made.

*Case 3.*[3]—The patient, a farmer's daughter, aged 16, lived at Highpoint, Mo. Infection started in an incised wound on the index finger on the right hand made by a kraut-cutter. Later a chain of 11 nodules developed on the ulnar side of the forearm and on the inner side of the upper arm. Two of those on the forearm broke down and ulcerated. Patient recovered under potassium iodide treatment. No cultural diagnosis was made.

KANSAS.

*Case 4.*[4]—The patient, aged 69, was a laborer by occupation and a resident of Kansas City. The infection started as a small pimple over the point of insertion of the deltoid muscle. This developed into a small ulcer, and others soon made their appearance until there were 15 ulcers and eight cutaneous nodules over the region of the deltoid muscle. Cultural diagnosis was made.

*Case 5.*[5]—The patient, female, aged 30, was a resident of Ottawa, Kan. She experienced a pricking sensation in the thumb and a few days later a reddened papule

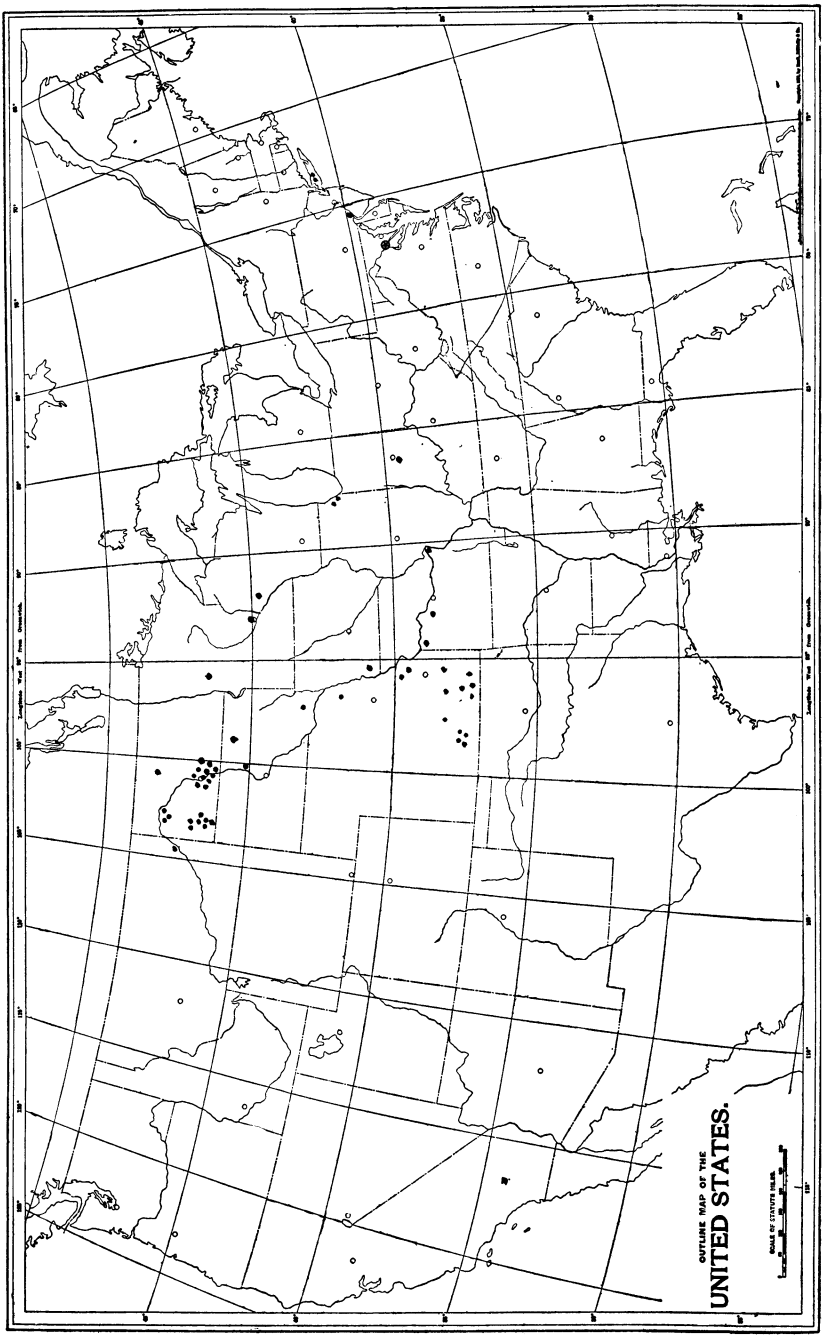
[1] *Johns Hopkins Hospital Bulletin*, 1898, 9, p. 286.

[2] Richard L. Sutton, *Jour. Am. Med. Assoc.*, 1910, 55, p. 2213.

[3] Richard L. Sutton, *ibid.*

[4] Trimble and Shaw, *Jour. Kansas Med. Society*, 1909, 9, p. 305.

[5] Richard L. Sutton, *Jour. Am. Med. Assoc.*, 1910, 55, p. 1000.


OUTLINE MAP OF THE
UNITED STATES.

developed on this area. This gradually increased and finally developed into an ulcer which was sharply outlined and free from pain. Four weeks later, a hard cutaneous nodule developed near the base of the thumb. At intervals of a few days, six other nodules developed higher up on the arm, extending from the thumb to the shoulder. Culture was isolated.

*Case 6.*[1]—The patient, a farmer's boy, aged 11, was a resident of Tyro, Kan. Infection started in a hen bite on the back of the hand. About four weeks after the injury was received, abscesses began to form on the forearm, and in the course of two months, 21 of these abscesses developed. No microscopic examination or cultural diagnosis was made.

*Case 7.*[2]—The patient, aged 45, was a farmer by occupation and a resident of Earlton, Kan. He had on his premises a horse that was probably afflicted with sporotrichosis. While repairing a manger in the barn, he sustained a punctured wound on the wrist from a piece of baling wire. The wound did not heal but increased in size and later small subcutaneous nodules began to appear on the flexor side of the forearm and upper arm. Ten of these nodules appeared within six weeks. Cultural diagnosis was made.

J. M. Sutton,[3] of Halstead, Kan., has reported the following four cases:

*Case 8.*[4]—The patient, aged 52, was a laborer by occupation. He punctured the palm of his left hand with a nail while tearing down an old barn. The wound healed without trouble but three weeks later a nodule developed on the dorsum of the hand opposite the site of the puncture. Within a week after this nodule had developed, 24 similar small nodules appeared higher up on the arm. A microscopic examination of the pus showed the presence of *Sporothrix schenkii.*

*Case 9.*[5]—The patient, aged 40, a farmer by occupation. He cut the index finger on the right hand with a disc harrow. The injury refused to heal and two weeks later showed signs of infection. Within two months, more than 50 small characteristic subcutaneous nodules appeared on the hand, forearm, and upper arm. No cultural or microscopic diagnosis was made.

*Case 10.*[6]—The patient, aged 35, was a farmer by occupation. He received a slight cut on the thumb which healed readily. Two weeks later the scar became inflamed and nodular enlargements developed on the dorsum of the hand. No cultural or microscopic diagnosis was made.

*Case 11.*[7]—The patient, aged 28, was a farmer by occupation. Infection started in a small pimple on the arm. This broke down and ulcerated and later seven small tumors appeared on the right upper arm. No cultural diagnosis was made.

All four of these cases were treated as sporotrichosis and made a rapid recovery under internal medication with potassium iodide.

[1] Richard L. Sutton, *Jour. Am. Med. Assoc.*, 1910, 55, p. 2213.

[2] Richard L. Sutton, *Boston Med. and Surg. Jour.*, 1911, 164, p. 179.

[3] *Jour. Am. Med. Assoc.*, 1911, 56, p. 1309.

[4] *Ibid.*

[5] *Ibid.*

[6] *Ibid.*

[7] *Ibid.*

*Case 12.*[1]—The patient, aged five, was a farmer's son, residing near Horton, Kan. Infection started in a scratch on the back of the hand which began to ulcerate. Later small nodules developed on the forearm and eventually broke down and formed ulcers. No cultural or microscopic diagnosis was made.

*Case 13.*[2]—The patient, aged17, was a farmer by occupation, residing near Wiley, Kan. Infection started in the form of a small papule on the left knee. Four nodules developed within a month higher up on the inner side of the thigh. No cultural or microscopic diagnosis was made.

*Case 14.*[3]—The patient, a woman aged 42, was a resident of Dennison, Kan. The infection started in the form of a papule on the middle of the right forearm. Within a short time afterward, seven small subcutaneous nodules appeared on the arm, two of which broke down and ulcerated. No cultural or microscopic diagnosis was made. Patient made a rapid recovery under potassium iodide treatment.

*Case 15.*[4]—The patient, aged 19, was a farmer by occupation, residing near Erie, Kan. The infection started in a small pimple on the dorsum of the left hand, gradually enlarged, and developed into an ulcer. The lymphatics leading up the arm became swollen and from 18 to 20 subcutaneous nodules developed in their course. A microscopic examination of the pus showed the presence of *Sporothrix schenkii.*

IOWA.

*Case 16.*[5]—The patient was a boy aged five, a resident of Shenandoah, Ia. The infection started in an abrasion on the finger which was sustained by a blow with a hammer. The abrasion began to ulcerate and 20 subcutaneous nodules developed in the lymphatics extending up the arm. A number of these broke down and formed ulcers. Cultural diagnosis was made.

NEBRASKA.

H. Gifford,[6] of Omaha, Neb., has reported the following six cases, only one of which, however, was diagnosed culturally.

*Case 17.*[7]—Infection in this case occurred on the eyeball and conjunctival surface of the eyelids of a young woman. Cultural diagnosis was made.

*Case 18.*[8]—The patient was a girl aged 14. Parents had noticed a growth in the right lower eyelid during the past month. At first there was only a small pimple but when seen by the physician there was found on the outer three-fifths of the lower lid a rough mass of granulations, elevated one-eighth of an inch above the surface, one-fourth of an inch broad at its outer extremity, and one-eighth of an inch broad at its inner extremity. Granulations were scraped out with a spoon and the wound cauterized. Recovery. No cultural diagnosis was made.

[1] Harry J. Harker, *Jour. Am. Med. Assoc.*, 56, p. 1312.

[2] Albert Beam, *ibid.*, p. 1790.

[3] W. B. Stewart, *ibid.*, 57, p. 482.

[4] Ralph C. Henderson, *ibid.*, 56, p. 1048.

[5] Hektoen and Perkins, *Jour. Exp. Med.*, 1900, 5, p. 77.

[6] *Oph. Record*, 1910, 19, p. 580.

[7] *Ibid.*

[8] *Ibid.*

*Case 19.*[1]—The patient was a boy aged 10. The infection started in the left lower eyelid which on examination presented two elevated areas of rough granulation tissue covered with slight crusts. One of these areas was just below the lashes and was one-fourth of an inch long and the other one, about twice as long as the first, was situated just below it. The granulation tissues were scraped out with a sharp spoon and iodiform dressing applied. Recovery.

*Case 20.*[2]—The patient was a woman aged 32. She had noticed a swelling below the left eye for about four months before consulting a physician. At the time of the examination the inner half of the left lower lid presented a mass of granulation tissue one-fourth of an inch in diameter, raised about one-eighth of an inch and covered with a thin crust. The granulation tissue was scraped out with a sharp spoon, an iodiform dressing applied, and the patient was given potassium iodide internally. Good recovery. No cultural diagnosis was made.

*Case 21.*[3]—The patient was a boy aged four and one-half. The infection started on the right lower lid in the form of a small reddish swelling. About the same time there appeared a painful lump at the angle of the right jaw. When seen by a physician, there was found on the inner side of the right lower lid an inch below the caruncle a reddish elevation five-eighths of an inch long and one-fourth of an inch broad. The epidermis was broken down in the center and the rest of the tumor was covered with smooth skin. A small amount of pus was squeezed out. The tumor was scraped out with a sharp spoon and the patient was given potassium iodide internally. Good recovery. No cultural diagnosis.

## SOUTH DAKOTA.

*Case 22.*[4]—The patient was a girl aged four. When seen by the physician, there was a mass of granulation tissue on the lower border of the right tear sac extending two-thirds of the way to the outer angle of the lower lid. The tumor was thoroughly scraped out with a sharp spoon and did not reappear. No cultural diagnosis was made.

*Case 23.*[5]—The patient was a farm laborer by occupation and resident of Groton, S.D. The infection started in the form of a pimple on the inner side of the leg, several inches below the knee. Later five subcutaneous nodules developed higher up on the leg and lower portion of the thigh. Cultural diagnosis was made.

*Case 24.*[6]—The patient, aged 27, was a farmer by occupation, and a resident of Potter County, S.D. The infection started in a small fissure on the index finger which gradually enlarged and developed into an ulcer. Within the next two weeks, about 15 small subcutaneous nodules appeared on the dorsal side of the forearm and on the inner side of the arm, extending up to the axilla. Cultural diagnosis was made.

## NORTH DAKOTA.

*Case 25.*[7]—The patient, aged 24, was a farmer by occupation, and a resident of Braddock, N.D. Infection started in the form of a papule on the back of the left hand.

[1] *Oph. Record*, 1910, 19, p. 580.
[2] *Ibid.*
[3] *Ibid.*
[4] *Ibid.*
[5] Walter Hamburger; reported to Am. Ass. of Path. and Bact., Chicago, April, 1911.
[6] G. S. Adams, Yankton, S.D. Case not yet reported.
[7] Hyde and Davis, *Jour. Cutan. Dis.*, 1910, 28, p. 321.

This began to ulcerate and later six nodules appeared on the left arm. Some time after the appearance of the nodules on the left arm, six similar nodules appeared on the lower third of the right arm, one on the right forearm, and one on the posterior surface of the leg near the knee. Cultural diagnosis was made.

*Case 26.*[1]—The patient, aged 45, was a farm laborer and a resident of Stark County, N.D. The infection started on the middle finger where he had received a prick from a straw. This developed into an ulcer and within a few weeks 21 subcutaneous nodules developed on the forearm and arm extending up to the axilla. Cultural diagnosis was made.

The following eight cases were treated by Dr. E. P. Quain of Bismarck and six of them were reported by him[2] as cases of "Tubercular Ulcers and Tubercular Lymphangitis of the Upper Extremity."

*Case 27.*[3]—The patient was a woman aged 35. The infection started in the form of a papule on the inner side of the leg. This developed into an ulcer and later a number of subcutaneous nodules appeared in the course of the swollen lymphatics leading up to the groin. Cultural diagnosis was made by Ruediger.

*Case 28.*[4]—The patient was a boy aged 5. The infection started in a bruise on the dorsum of the hand which became infected, and about a month later small nodules began to appear under the skin of the forearm. The nodules gradually softened and discharged pus and showed no tendency to heal. No cultural diagnosis was made.

*Case 29.*[5]—The patient was a girl aged 18, a country school-teacher by occupation. The infection started in a cut on the left thumb which began to ulcerate and refused to heal. About six weeks after the injury was sustained, a number of small tender nodules were discovered in the subcutaneous tissues of the forearm and arm. The majority of these nodules opened spontaneously and discharged a thin purulent material. No cultural diagnosis was made.

*Case 30.*[6]—The patient was a woman, aged 40. The infection started from a small abscess on the back of the left hand from which developed an acute cellulitis of the arm and a lymphangitis of the arm and forearm. The abscess was incised and the acute symptoms subsided but the ulcer refused to heal and a number of small pustules appeared on the posterior surface of the forearm. A month later a chain of small subcutaneous tumors appeared along the anterior surface of the arm near the elbow. No cultural diagnosis was made.

*Case 31.*[7]—The patient was a man aged 70. The infection started in the form of a small ulcer over the distal end of the radius. A month later, secondary nodules appeared in a line along the radial side of the forearm extending to the elbow. These nodules subsequently broke down and ulcerated. No cultural diagnosis was made.

*Case 32.*[8]—The patient was a woman aged 48. The infection started in a slight bruise on the posterior surface of the right forearm which developed into an abscess. The pus was evacuated but the ulcer refused to heal and within a month a number of small subcutaneous nodules appeared chainlike along the anterior surface of the forearm extending from the ulcer to the elbow. No cultural diagnosis was made.

[1] Ruediger and Miller, *Jour. Minn. State Med. Ass.*, 1911, 31, p. 507.

[2] *St. Paul Med. Jour.*, 1904, 6, p. 615.

[3] Ruediger and Miller, *loc. cit.*

[4] E. P. Quain, *loc. cit.*

[5] *Ibid.*

[6] *Ibid.*

[7] *Ibid.*

[8] *Ibid.*

*Case 33.*[1]—The patient was a girl aged three, a granddaughter of patient No. 32. The infection started from a small scratch on the wrist which the child had playfully bandaged with dressings that had been used on the ulcers on the grandmother's arm. No cultural diagnosis was made.

*Case 34.*[2]—No satisfactory history of this case is available. Infection involved the forearm and the arm and was characterized by the development of a number of small subcutaneous nodules which gradually broke down and ulcerated. Scrapings from the ulcers were sent to the Public Health Laboratory to be examined for tubercle bacilli with negative results.

*Case 35.*[3]—The patient was a girl, aged three and one-half, a resident of Dunn County, N.D. The infection started in a cut on the index finger of the left hand which became greatly inflamed and swollen. Several weeks later, about 10 subcutaneous nodules developed on the posterior surface of the forearm and arm. Cultural diagnosis was made.

*Case 36.*[4]—The patient was a woman aged 43, a resident of Dunn County, N.D. The infection started in the form of a pimple on the back of the hand which soon resulted in an extensive cellulitis of the hand and arm. The papule began to ulcerate and within several months 12 subcutaneous nodules developed along the course of the lymphatics extending to the axilla. Ten of these were incised and resulted in very refractive ulcers. No cultural diagnosis was made.

*Cases 37, 38, and 39.*[5]—Dr. V. H. Stickney refers to five cases that were seen by him in Dickinson, N.D. Two of these cases were treated by Dr. G. A. Perkins and three by Dr. Stickney, who sent me the following descriptions:

In one case which was observed in 1905, the characteristic nodules were confined to the hand and forearm and appeared in a row along the course of the lymphatics. In the second case which was treated by him in 1905, the lesions extended along the arm and upper arm to the axilla. The third case was seen by him in the spring of 1907. In this case, the nodules appeared on the right shoulder and the left side of the neck and face. No positive diagnosis was made in either case.

*Case 40.*[6]—The patient, aged 19, was a farm laborer by occupation and was living in Kidder County, N.D., at the time infection was contracted. The infection started in the form of a pimple on the back of the hand which began to ulcerate. The ulcer refused to heal and in the course of several weeks four nodules developed higher up on the forearm. Cultural diagnosis was made.

[1] *Ibid.*

[2] Not previously reported.

[3] Ruediger and Smith, *Journal-Lancet*, 1912, 32, p. 227.

[4] *Ibid.*

[5] *Jour. Minn. State Med. Ass.*, 1911, 31, p. 512.

[6] G. M. Olson. Not yet published. Will appear in the *Jour. Am. Med. Assoc.*

The following six cases were collected from North Dakota by the writer and have not been previously reported.

*Case 41.*[1]—The patient, a woman aged 20, was a resident of Morton County, N.D. The infection started in the form of a small pimple on the elbow, which gradually developed into a discharging ulcer. Five weeks after the initial sore was noticed, secondary nodules began to appear in rapid succession until five of these were found on different parts of the arm. Cultural diagnosis was made by Ruediger.

*Case 42.*—The patient, aged 32, was a farmer by occupation, living in McHenry County, N.D., and was in the care of Dr. J. T. Newlove of Minot. The infection started as a small swelling on the hand which gradually subsided but very soon afterward a red and inflamed area appeared between the thumb and index finger. About 10 days later, he consulted a physician who discovered a number of small subcutaneous nodules extending up the forearm, above the inflamed area. Cultural diagnosis was made by Mr. L. V. Parker of the State Public Health Laboratory.

*Case 43.*—This case was reported to me in a letter by Dr. John A. Johns of Hettinger, N.D. The patient was a woman, aged 42, residing in Adams County, N.D. The infection started in the form of a pimple on the inner surface of the forearm. Little attention was paid to this but others gradually developed until six of these nodules had appeared and began to break down and ulcerate. On examination, it was found that there was a chain of hard subcutaneous nodules extending along the upper arm to the axilla. No cultural diagnosis was made but the case was treated as one of sporotrichosis, and made a rapid recovery under potassium iodide.

The following three cases were reported to me in a letter by Dr. George C. Hanson of Charlson, N.D. In these cases, a clinical diagnosis of sporotrichosis had been made but no cultural diagnosis was made.

*Case 44.*—The patient was a boy aged four. The infection started in a slight scratch on the back of the hand which started to ulcerate and refused to heal. Three weeks later when seen by the physician, the ulcer was as large as a half-dollar, and a number of subcutaneous nodules were found under the skin of the forearm. The patient made a rapid recovery under potassium iodide treatment.

*Case 45.*—The patient was a man aged 48. The infection started as a pimple on the dorsum of the right hand and developed into a refractory ulcer. When seen by the physician, this ulcer was as large as a half-dollar and there was a chain of subcutaneous nodules along the radial side of the forearm and inner side of the arm extending to the axilla. A few of the nodules on the forearm had broken down and were discharging a thin purulent fluid. Patient made a rapid recovery under potassium iodide treatment.

*Case 46.*—Patient was a boy aged seven. The infection started on the back of the hand and developed into a small refractory ulcer. When seen by the physician about three weeks later, there was found a chain of 15 subcutaneous nodules extending along the dorsal surface of the forearm.

*Case 47.*[2]—The patient, aged 41, was a farmer by occupation and a resident of Poplar, Mont. The infection started in the tip of the index finger. The patient first

[1] Patient of Dr. H. Altnow, Mandan, N.D. Not previously reported.

[2] Patient of Dr. John A. Johnson, Bottineau, N.D. Not previously reported.

noticed a slight pricking sensation, and when the finger began to swell slightly, he thought he had a sliver of wood in it which he attempted to remove with a pin. A little pus escaped and as the finger was inflamed and swollen he poulticed it with fresh cow manure and continued this treatment for 12 days. After the finger had been poulticed for eight days, a cauliflower growth, the size of a hazelnut, developed at the site of the injury. About ten days later purplish nodules began to appear on the back of the arm, extending to the elbow. When seen by the physician, 15 of these nodules were present and one large abscess was discovered. Cultural diagnosis was made by Ruediger.

The remaining 10 cases occurred outside of the Missouri Valley and were widely scattered from the Atlantic to the Pacific coast as is shown by the abstracts below.

*Case 48.*[1]—The patient, aged 50, was a laborer by occupation and resident of St. Paul. His work necessitated the handling of green hides. The infection started in the form of a pimple on the back of the right hand, which gradually enlarged and finally developed into an ulcer. About three weeks later, another similar swelling appeared over the distal end of the ulna and later many others appeared higher up on the ulnar side of the forearm and arm. Cultural diagnosis was made.

*Case 49.*[2]—The patient was a woodsman by occupation and had been working in the vicinity of Frazee, Minn. The infection started as an ulcer on the back of the hand and in the course of several months more than 25 characteristic nodules and superficial ulcers developed on the forearm and arm extending chainlike up to the axilla. Cultural diagnosis was made.

*Case 50.*[3]—The patient was a young woman, resident of northern Wisconsin. The infection started in a small cut made with a knife, on the middle finger, while peeling potatoes. The finger became inflamed and a lymphangitis extended up the arm. The original injury began to ulcerate and for a period of one and a half years repeated nodules developed on the arm and forearm which gradually softened and began to ulcerate. No cultural diagnosis was made.

*Case 51.*[4]—The patient, aged 25, was an express packer by occupation and a resident of Chicago. The infection started in the form of a flat pimple or tumor on the leg which gradually enlarged and finally developed into a discharging ulcer. A number of these ulcers developed higher up on the leg. A cultural diagnosis was made.

*Case 52.*[5]—The patient was a woman aged 25, a florist by occupation, and a resident of Chicago. The infection started in the form of a cold abscess on the forearm which was followed by several similar abscesses higher up on the arm. No cultural diagnosis was made.

*Case 53.*[6]—In this case, which occurred in a male, the infection started in a punctured wound on the finger. The chain of secondary nodules and ulcers extended

[1] J. M. Armstrong, *St. Paul Med. Jour.*, 1912, 14, p. 218.

[2] Patient of Dr. J. A. Thabes, Brainerd, Minn. Not previously reported.

[3] Harry Ritchie, *Jour. Minn. State Med. Ass.*, 1911, 31, p. 511.

[4] K. A. Zurasky, *Jour. Cutan. Dis.*, 1910, 28, p. 350.

[5] W. A. Pusey, *Jour. Cutan. Dis.*, 1910, 28, p. 352.

[6] Brayton, Abstract by R. L. Sutton, *op. cit.*

from the finger to the elbow and finally healed with considerable scarring. No bacteriological diagnosis was made.

*Case 54.*[1]—The patient was a resident of Philadelphia. Infection started from an injury on the finger which was followed by a chain of subcutaneous nodules and abscesses along the lymphatics of the arm. No cultural diagnosis was made.

*Case 55.*[2]—The patient was a boy aged 12, an inmate in a children's home at Smithtown Branch, N.Y. When the infection was discovered, there was found an ulcer on the top of the great toe and another one on the instep of the same foot. There was also present at that time a bluish, sharply defined nodule on the back of the wrist. This nodule fluctuated, and when opened, discharged a thick tenacious brownish pus which, on microscopic examination, showed the presence of *Sporothrix schenkii.* During the next month, two other subcutaneous nodules developed on the forearm. Patient was put on potassium iodide treatment and rapidly improved but left the children's home before the ulcers had entirely healed and had a relapse. At this time, about 20 ulcers and sores developed on his body.

*Case 56.*[3]—This case occurred in the same children's home as did the preceding case. The infection started in the form of a purplish nodule on the back of the hand and was followed very soon by a similar nodule on the wrist. Microscopic diagnosis was made.

*Case 57.*[4]—The patient was a farm laborer by occupation and a resident of Santa Ana, Cal. The infection apparently started on the left leg but later involved the right leg and also the face. Cultural diagnosis was made.

I am well aware that this series of reported cases is rather small for drawing general conclusions in regard to the geographical distribution of this disease. It is a very significant fact, however, that five-sixths of the total of 57 cases have been observed in the Missouri Valley. Another very important point is our finding in North Dakota. I have been able to collect 22 authentic cases from this state and every one of these occurred along the Missouri River. Not a single case in North Dakota has thus far been found outside of the Missouri Valley. It appears, therefore, that this organism is more commonly found along the Missouri River than in any other part of the United States.

It is an interesting question whether the organism lives as a saprophyte upon grains, grasses, or other vegetation, from which the infection is contracted, or whether each case is related directly to another pre-existing case. It seems, however, that the former must be the case because the disease is found most commonly

[1] Stelwagon, *Jour. Cutan. Dis.*, 1910, 28, p. 252.

[2] Guy H. Turrell, *Long Island Med. Jour.*, 1911, 5, p. 484.

[3] *Ibid.*

[4] Burlew, *Southern California Practitioner*, 1909, 24, p. 1.

among farm laborers and the cases are nearly always isolated. I know of only two instances where a second case developed in an individual who had associated with a person suffering from this infection. One of these was Dr. Turrell's case in the children's

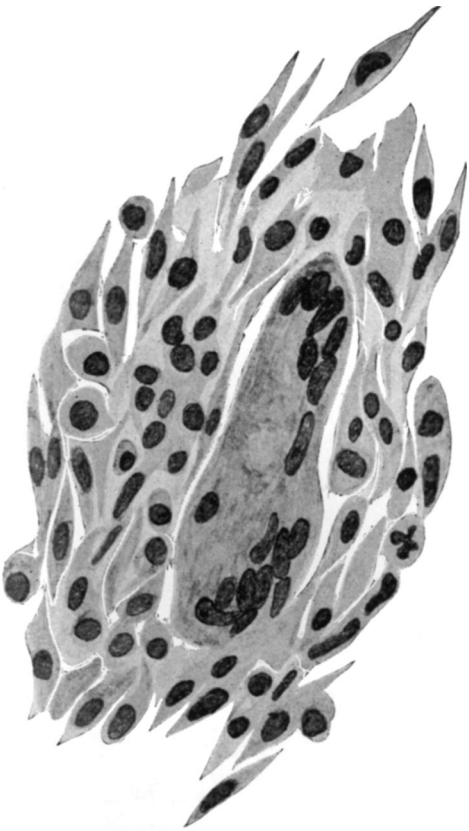


FIG. 1.—Camera lucida drawing of section from secondary nodule. Number 4 eyepiece and number 6 objective, Leitz.

home at Smithtown Branch, N.Y., and the other was the case of the small girl who had playfully bandaged a sore on her finger with cloths that had been contaminated with the pus from a sporothrix infection on the arm of another person (Case 33).

It has been suggested by Sutton and by Hyde and Davis that

the infection in man may be contracted from horses. There is, however, no direct evidence to support this statement. Hyde's patient had lived in a neighborhood where a number of horses had been suffering from a disease which was thought might have been sporotrichosis. I am informed, however, by several veterinarians

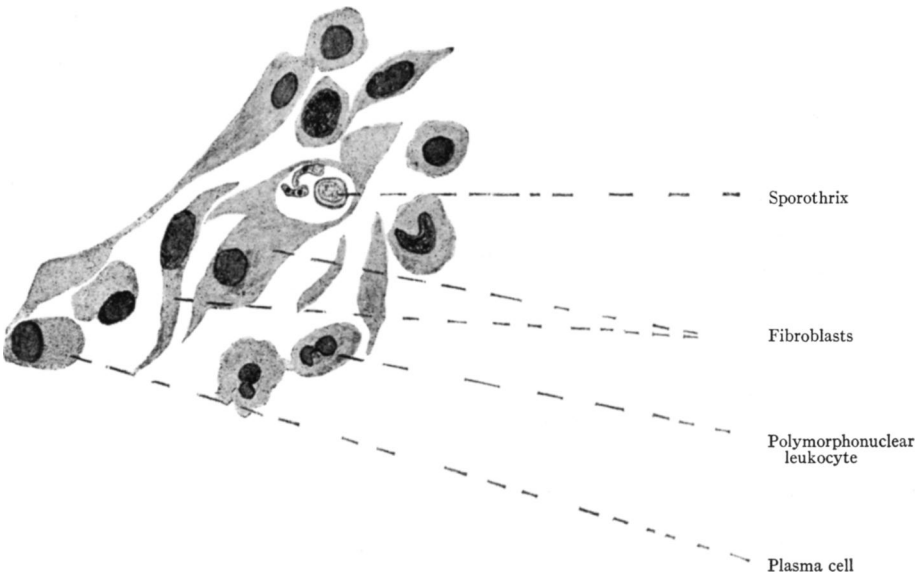



FIG. 2.—Showing sporothrix in the tissue of a secondary nodule. Camera lucida drawing: number 4 eyepiece and $\frac{1}{12}$ inch oil immersion objective, Leitz.

of this state who saw these horses that the horses were suffering from glanders and not from sporotrichosis.

## HISTOLOGY OF THE SECONDARY NODULES.

Not a great deal is to be found in the American literature regarding the histology of the secondary nodules. I have recently had an opportunity to study several of the nodules, which were excised for me by Dr. E. P. Quain. The sections show that the nodules in the early stages are made up of embryonal connective tissue, which is infiltrated with plasma cells and a small number of polymorphonuclear leukocytes. The polymorphonuclear leukocytes are relatively few in number, whereas the plasma cells are abundant in some areas and more scarce in others. Relatively

large giants cell are frequently seen (Fig. 1). There seems to be no proliferation of capillaries.

In the later stages evidence of necrosis makes its appearance. This is indicated by a blurring of the section due to karyolysis and karyorhexis. The nuclei which still take on the hematoxylin stain are very often greatly elongated and distorted. Some of these areas cannot be distinguished from areas of tuberculosis. Finally liquefaction takes place and there may be a secondary infection with staphylococcus, resulting in the formation of pus.

Some writers make the statement that the sporothrix cannot be found in the secondary nodules. This evidently is a mistake, because it is very easy to isolate it in pure culture from these nodules, by carefully incising one, even before liquefaction has set in. I have isolated the organism in this manner from three cases. It is, however, not easy to find the organism in sections of the tissue from the nodules, but if a prolonged search is made they will be found. Fig. 2 is a camera lucida drawing showing the organism in the tissue from a secondary nodule.